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10/581,851	02/22/2007	Hachiya Takeuchi	42598-4100	4586

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EXAMINER	
SLAWSKI, BRIAN R	

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1791	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/581,851	TAKEUCHI ET AL.	
	Examiner	Art Unit	
	BRIAN R. SLAWSKI	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 October 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7,8 and 15-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7,8,15,16,18,19,21 and 22* is/are rejected.

7)☒ Claim(s) *17,20 and 23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 June 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

BONDING APPARATUS AND BONDING METHOD

Detailed Action

1. Applicant's request for reconsideration filed October 21, 2009, was received. Claims 1, 7, 8, and 15-17 were amended. Claim 9 was cancelled. Claims 18-23 were added.

2. The text of those sections of Title 35, U.S. Code, not included in this action can be found in the Office Action issued July 22, 2009.

Claim Objections

3. Claims 19 and 20 are objected to for duplicating claims 16 and 17, respectively. Appropriate correction is required.

Claim Rejections—35 USC §112

4. Claims 17 and 20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 17 and 20 recite a rotatable conveying unit that consists only of a turntable. Applicant does not provide explicit support for this recitation in the specification, and one of ordinary skill in the art would not have

understood from Applicant's disclosure that the taught conveying means is necessarily limited to only a turntable.

Claim Rejections—35 USC §102

5. The rejections of claims 1-4, 7, and 8 as being anticipated by Matsumoto et al. (US 2003/0104097) are withdrawn because claim 1 has been amended.

Claim Rejections—35 USC §103

6. Claims 1-4, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al. (US 2003/0104097) in view of Miyano et al. (US 6,312,549, newly cited).

Regarding claim 1, Matsumoto et al. teach an apparatus for making optical recording discs by bonding together pairs of molded disc substrates [0001, 0002]. The apparatus comprises a bonding part on turntable 10, a curing part on turntable 20, and conveying means including these two turntables and other moving units (Fig. 1; [0034, 0041-0042, 0044, 0053]). Complementary pairs of substrates A and B are placed on adjacent positions 10a around turntable 10, where an adhesive supply mechanism 12 applies adhesive to substrates A. Turntable 10 intermittently rotates to convey the adhesive-coated substrates to the bonding part beneath overlapping mechanism 13, which pairs the substrates B and A and bonds them together (Fig. 6, 7, 9; [0045-0048, 0081-0083, 0088, 0091]).

The conveying means then conveys the bonded pairs of substrates from the bonding part to the curing part while they stand at room temperature in the atmosphere. Bonded substrate pairs are conveyed via turntable 10, mounting mechanisms 14 and 19, and turntable 20 to a curing part at position P9, where a curing device 23 irradiates the substrate pairs to cure the adhesive [0049-0051, 0054, 0059]. During the conveying on turntable 20 and prior to curing at position P9, a weight is placed on top of each substrate pair at position P7 and removed at position P8, where the weights correct any warping of the hot substrates following bonding (Fig. 11; [0056-0057, 0096-0097]). Hence Matsumoto et al. teach conveying means having a standing part that conveys the substrates for a time period required for any correction of warping before the adhesive is cured, while allowing them to stand at room temperature in the atmosphere.

Matsumoto et al. do not specifically teach a vacuum vessel in which the substrates are bonded under vacuum. However, Matsumoto et al. teach that during bonding of the substrates, a voltage is preferably applied between the substrates A and B to eliminate air bubbles between them [0090-0091, 0094]. Miyano et al. teach that in the manufacture of optical discs by bonding together adhesive-coated disc substrate pairs, it is also conventional to conduct the bonding step under vacuum in a vacuum chamber in order to prevent air bubbles from forming in the adhesive (Fig. 7, 8; col. 1, LL. 6-14, LL. 18-65). It would have been obvious to one of ordinary skill in the art to substitute a vacuum vessel for the voltage-applying means of Matsumoto et al., because Miyano et al. teach that a vacuum vessel is a well known alternative means of removing air bubbles between optical disc substrates when bonding them together.

Regarding claims 2 and 3, Matsumoto et al. teach conveying means comprising multiple turntables 10 and 20 that rotate while carrying a plurality of the substrates.

Regarding claim 4, Matsumoto et al. teach that the multiple turntables include concentric small-diameter and large-diameter tables, in that the turntable 10 includes a large-diameter table that carries the substrates in receiving positions 10a and a concentric small-diameter table on which the adhesive supply mechanism 12 is mounted (Fig. 1; [0045, 0047]). (Note that claim 4 does not characterize the concentric small-diameter and large-diameter tables among the turntables as each being necessarily rotatable. Nonetheless, Matsumoto et al. teach that the adhesive supply mechanism 12 rotates its supply nozzle through 360° onto each of the disc substrates (Fig. 1, 7; [0047, 0088]), so that it would have been obvious to the skilled artisan to make the small-diameter table of turntable 10 rotatable.)

Regarding claim 7, Matsumoto et al. teach that the overlapping mechanism 13 on turntable 10 stacks and bonds pairs of substrates A and B, and that these stacked pairs (i.e., stacked pluralities of substrates) are then conveyed from the bonding part to the curing part by accommodating parts on turntable 10, mounting mechanisms 14 and 19, and turntable 20 (Fig. 7; [0048-0049, 0055, 0091-0092].

Regarding claim 8, Matsumoto et al. teach conveying the substrates from the bonding part to the curing part using only turntables 10 and 20 and mounting mechanisms 14 and 19 that adsorb the substrates and swivel to transport them [0065, 0067], so that no shifting of the substrates relative to each other occurs between the bonding part and curing part.

7. Claims 15, 18, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosogai (JP 10-289491) in view of Kotoyori (JP 2002-074759) and Higaki et al. (US 2002/0108715). (Improved translations of Hosogai and Kotoyori are provided with this action.)

Regarding all of claims 15, 18, and 21, Hosogai teaches an apparatus for making optical recording discs including a pair of thin plastic substrates W1, W2 and a recording layer (signal surface), the substrates being coated with adhesive S and bonded together (Fig. 8, 9; [0001-0004, 0007]). The apparatus comprises a turntable T that receives the substrate pair W1, W2 with adhesive therebetween from adhesive application position C; and means (machinery stand M) to intermittently rotate the turntable T and convey the substrates through sequential positions. These include: a bonding position E, where the substrates are lightly pressed together and held by vacuum on holding member 1; a pre-curing substrate rotary position F, where the holding member 1 spins the vacuumed bonded substrate pair at ambient temperature without further contact to spread the adhesive; a curing position G, where UV light irradiates the pre-cured bonded substrates; an ambient-temperature post-curing empty position H; and an exit position I for removing the optical recording disk (Fig. 6, 9; [0004, 0009, 0014]).

While Hosogai does not explicitly teach relieving stress and avoiding warping in the bonded substrate pair at pre-curing rotary position F, Kotoyori specifically addresses warpage in laminated optical discs, noting that their substrates are typically made by injection molding a plastic and then punching out the center hole, producing a warped

center area with residual stress; curing the adhesive between substrates in this state fixes their shape to produce a warped disc (Abstract; [0006-0007]). Hence, Kotoyori teaches bonding two warped disc substrates 1, 2 into a layered disc 4 via curable adhesive 3, then simply supporting the soft uncured disc 4 on a flat support 12 for a short time, so that the disc settles by its own weight against the support; the disc is then cured in a flat shape by irradiation (Fig. 3a, b; [0044-0046]). It would have been obvious to one of ordinary skill in the art to keep Hosogai's bonded substrates in the pre-curing rotary position F for a first predetermined time, both to complete the spread of adhesive by spinning taught by Kotoyori and to let the uncured substrate pair relieve internal stress and avoid warping by settling against flat support 1, as taught by Kotoyori.

Hosogai does not explicitly teach that the post-curing empty position H enables relief of heat warping from the UV curing. However, Higaki also makes optical recording disks by bonding pairs of plastic substrates with adhesive, then curing the adhesive by UV irradiation, teaching that the curing warps the bonded substrates by uneven heating (Abstract; [0002, 0008-0009, 0059]). Higaki prevents this warping by, e.g., irradiating in two steps to reduce heat build-up, or by limiting the UV exposure with a timed shutter [0093, 0094, 0100-0101, 0103]. Higaki teaches that the heat warping of the bonded substrates after curing can be relieved by simply allowing the substrates time to cool and return to their original flat state [0094-0095]. Hence it would have been obvious to one of ordinary skill in the art to relieve heat warping in Hosogai's irradiated substrates by holding them for a second predetermined time at post-curing position H while they settle flat, as taught by Higaki.

8. Claims 16, 19, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosogai, Kotoyori, and Higaki et al. as applied to claims 15, 18, and 21 above, and further in view of Paulus et al. (US 6,098,272).

Regarding all of claims 16, 19, 22, and 23, the skilled artisan familiar with Kotoyori would have known to maintain Hosogai's bonded pair of substrates W1, W2 at pre-curing rotary position F for a first time period sufficient to relieve the substrates' internal stress and let them settle flat against the support 1, as described in paragraph 6 above. Kotoyori does not explicitly teach letting the substrates settle for as long as 15 seconds. However, Paulus et al. also make optical recording discs by bonding pairs of plastic substrates 6 with adhesive at station 35, conveying the bonded combinations 7 from bonding station 35 to a spin station 40 on a conveying unit 25, spinning the combinations to distribute the adhesive more evenly, and curing the adhesive with UV light at cure station 45 (Fig. 2; col. 1, L. 38-41; col. 4, L. 16-30, L. 34-41). Paulus et al. teach providing the combinations sufficient time on the conveyance between the bonding and spin stations 35 and 40 to let the adhesive flow to the moats conventionally molded in such substrates, where a preferred length of this standing time is approximately 23 seconds (col. 2, L. 25-30; col. 4, L. 30-34; col. 5, L. 22-30). It would have been obvious to one of ordinary skill in the art to maintain Hosogai's bonded pair of substrates W1, W2 at the pre-curing rotary position F for at least 7 seconds (claim 23) and further for at least 15 seconds (claim 22), because Paulus et al. teach that such a standing time allows the adhesive to spread sufficiently between the substrates.

Response to Arguments

9. Applicant's arguments filed October 21, 2009 have been fully considered but they are not persuasive. With respect to claim 1, Applicant argues that Matsumoto et al. do not teach a conveying means which conveys the substrates into the atmosphere at room temperature after the substrates are bonded in a vacuum vessel, and which provides sufficient time to correct any warping of the substrates before curing the adhesive. The examiner notes that the conveying means of Matsumoto et al. (turntable 10, mounting mechanisms 14 and 19, and turntable 20) that conveys the substrates from the bonding part at overlapping mechanism 13 to the curing part at position P9 does so in the atmosphere at room temperature, and that, though Matsumoto et al. do not specifically teach a vacuum vessel in which the substrates are bonded, they do teach applying a voltage between the substrates at the bonding position to eliminate air bubbles from the adhesive [0090-0091, 0094]. Because Miyano et al. teach that a vacuum chamber is also a well-known means in the art of removing air bubbles from the adhesive used to laminate optical disc substrates, it would have been obvious to one of ordinary skill in the art to substitute a vacuum vessel for the voltage-applying means of Matsumoto et al. to achieve the same effect. "Exemplary rationales that may support a conclusion of obviousness include: ...(B) Simple substitution of one known element for another to obtain predictable results." [See MPEP §2143 and *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385, 1395-97 (2007)].

Further, Matsumoto et al. place a weight atop each bonded substrate pair over a standing part of the conveying means between positions P7 and P8 before bonding position P9, teaching that the time of the weights' application is sufficient to correct any warping of the substrates (Fig. 11; [0056-0057, 0096-0097]). While the use of weights by Matsumoto et al. to correct warping may be distinct from Applicant's technique, this disclosure nonetheless reads on the recitation of claim 1.

With respect to claim 4, Applicant argues that Matsumoto et al. do not disclose a plurality of turntables including concentric small diameter and large diameter tables. The examiner argues that Matsumoto et al. do in fact disclose multiple turntables, e.g., 10 and 20, where turntable 10 includes a large-diameter table for conveying the substrates and a smaller central table on which the adhesive supply mechanism 12 is mounted (Fig. 1).

With respect to claim 7, Applicant argues that Matsumoto et al. do not disclose an accommodating part which stacks and accommodates a plurality of substrates that are conveyed from the bonding part. The examiner maintains that the overlapping mechanism 13 of Matsumoto et al. satisfies this claim as it stands, in stacking complementary pairs (i.e., pluralities) of substrates A and B that are then conveyed from the bonding part.

With respect to claim 8, Applicant argues that Matsumoto et al. disclose shifting of the substrates between the bonding part and curing part with handling devices such as the mounting mechanisms 14 and 19. However, in light of Applicant's disclosure, it is clear that the recitation "no operation of any shifting of the substrates" in claim 8 is not

meant to preclude handling and moving of the bonded substrates between the bonding part and curing part, in that Applicant's invention involves conveying the bonded substrates and optionally shifting them between multiple turntables in this interval (e.g., Fig. 1, 7, and 8 in the instant specification). Hence, this claim is interpreted as indicating that the substrates are not shifted with respect to each other between the bonding part and curing part.

With respect to claim 9, the examiner notes that this claim has been cancelled and its subject matter incorporated into claim 1.

Regarding claim 15, Applicant argues that Hosogai and Kotoyori do not teach a conveying means which conveys the substrates from a vacuum vessel into an atmosphere at room temperature after the substrates are bonded in the vacuum vessel. The examiner points out that claim 15 as written does not require bonding in a vacuum vessel, but rather "application of a vacuum to the pair of plastic substrates for bonding". Hosogai's turntable, which holds the substrate pair to the holding member 1 with a vacuum chuck during bonding and then conveys the bonded pair in the atmosphere at ambient temperature, satisfies this recitation.

Applicant contests that Hosogai does not disclose a conveying means having a standing part which allows the bonded substrates to stand for a time sufficient to correct warping. However, the position F provided on Hosogai's turntable does constitute a standing part in which the substrates stand for some undisclosed time period between the bonding position E and curing position G, sufficient for spinning the substrates to spread the adhesive between them. Given that Kotoyori teaches that optical disc

substrates are formed warped by conventional methods, and should therefore be first bonded, then left to stand on a flat support for enough time to settle flat, then cured, it would have been obvious to the skilled artisan to apply this simple lesson to Hosogai by giving the bonded substrates enough time at position F to settle against their flat support 1. That the substrates are also spun at position F does not preclude them from prior or simultaneous settling there in such a manner—Kotoyori teaches that the settling will occur spontaneously in the soft uncured disc laminate under its own weight—and the fact Kotoyori's apparatus is configured with somewhat different conveying means from Hosogai's would not prevent the skilled artisan from seeing how Kotoyori's standing period would be implemented in Hosogai's apparatus.

Applicant argues that Higaki et al. do not teach a conveying means having a standing part to correct warping in the substrates before the adhesive is cured. The examiner notes that Higaki et al. is cited not for this teaching, which is provided by Hosogai and Kotoyori, but for teaching that bonded optical disc substrates should be left to stand *after* the adhesive is cured in order to relieve heat warping. Because Hosogai already teaches an empty position H in the conveying means following the curing station, it would have been obvious to the skilled artisan to let the cured bonded disc pairs stand here long enough to relieve post-curing heat warping in light of Higaki et al.

Regarding claim 16, Applicant argues that Paulus et al. do not teach a conveying means with a standing part between the bonding station and before the UV curing station. The examiner disagrees: Paulus et al. clearly teach an apparatus for adhesively bonding optical disc substrates in which a conveying means 25 moves

substrate pairs from a bonding station 35 to a UV curing station 45, with an intermediate spin station 40 like that of Hosogai for spinning the bonded substrates to spread the adhesive therebetween. Paulus et al. teach that sufficient standing time, approximately 23 seconds in their example, should be provided on the conveying means between the bonding station 35 and spin station 40 for the adhesive to spread sufficiently by natural flow (Fig. 2; col. 1, L. 38-41; col. 4, L. 16-41; col. 5, L. 22-30), so that it would have been obvious to the skilled artisan to maintain Hosogai's bonded substrates in position F for at least 15 seconds.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN R. SLAWSKI whose telephone number is (571)270-3855. The examiner can normally be reached on Monday to Thursday, 7:30 a.m. to 5:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino, can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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